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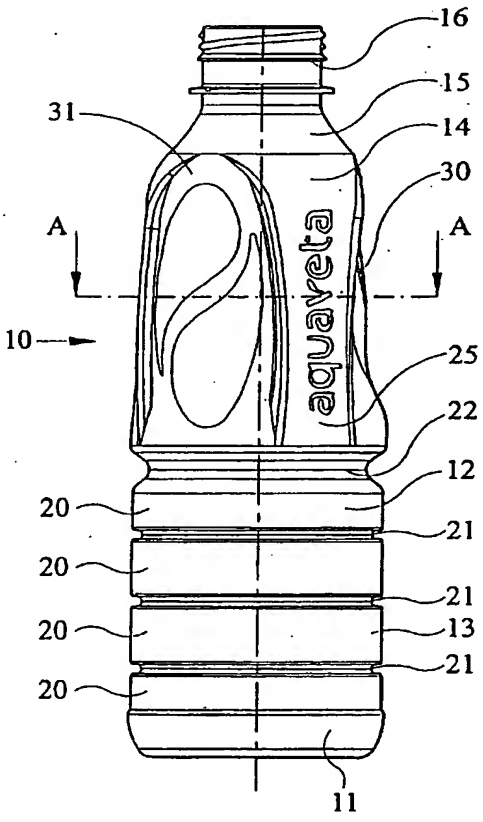
(54) Title: HOT FILL BOTTLE



(57) Abstract: The present invention discloses a hot fill bottle (10) of polymeric material having a plurality of thermal expansion panels equally spaced around a peripheral wall of the bottle and three dimensional logos embossed into the peripheral wall of the bottle. The three dimensional logos constitute, at least in part, the thermal expansion panels. Thus, instead of the thermal expansion panels contributing to an unsightly component of the bottle that needs to be covered up by a label, it is now possible to make the thermal expansion panel double as an eye catching logo.

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Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

HOT FILL BOTTLE

INTRODUCTION

This invention relates to a hot fill bottle and more particularly a hot fill drink bottle manufactured from blow moulded polyester resin usually polyethylene terephthalate (PET).

BACKGROUND OF THE INVENTION

Hot fill PET bottles have become increasingly popular as an attractive sturdy throw away drinks container. The process for manufacturing and filling a hot fill bottle is to fill the moulded PET bottle with liquid at a temperature of about 83°C, and sealing the container whilst the liquid is hot in order to provide adequate sterilisation. The filling of the bottle at that temperature and subsequent cooling to room temperature causes, in a 700ml bottle, about 25ml to 30ml contraction of the contents. As the PET bottles are filled there is a slight expansion caused by the gravitational effect of the hot liquid on the softening plastics. However, as the contents cool they contract thereby creating a partial vacuum in the heated bottles. The partial vacuum can, unless restricted by the structure of the bottle, cause uncontrolled distortion of the wall(s) of the bottles. Uncontrolled distortion can give the bottles a mis-shaped appearance that makes labelling of the bottles difficult and detracts from the marketability of the end product.

Considerable amount of research and design has gone into designing the profile of a bottle that can facilitate the contracting without distorting the end shape and appearance of the bottle. One such well known

proposal is to provide a series of thermal expansion panels in a lower portion of the bottle. These panels usually number six and are equally spaced around the periphery of the bottle. The panels have a projecting cricket bat like profile that contracts inwardly to compensate for the volume reduction as the contents cool to room temperature. The thermal expansion panels ensure that the remainder and more aesthetically critical components of the container do not distort. It is usual to cover up the thermal expansion panels with a label to disguise their somewhat unsightly nature.

There have been other suggestions of varying the number and positioning of the panels to achieve the same contraction function.

Hot fill PET bottles of the kind described are also designed to be aesthetically pleasing and have ribs and other strengthening devices incorporated in the profile of the bottle to ensure that the bottle can withstand the stresses that it would be subjected to in use. The designers of bottles of this kind also often wish to include in the bottle structure itself embossed trade marks by way of words or devices.

It is these issues that have brought about the present invention.

SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a hot fill bottle of polymeric material having a plurality of thermal expansion panels equally positioned around the periphery of the bottle and three dimensional logos embossed into the wall of the bottle characterised in that the three dimensional logos constitute, at least in part, the thermal expansion panels.

Preferably, three equally spaced thermal expansion panels are positioned around the bottle.

The three dimensional logos each comprise two concave tear drop shapes interconnected by a raised land whereby the tear drop shapes flex to compensate for volume changes of the bottle.

Preferably, the bottle is blow moulded in polyester resin, usually polyethylene terephthalate (PET).

DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figures 1 to 3 are side elevational views of a hot fill PET bottle viewed from different angles,

Figure 4 is a cross sectional view taken along the lines A-A of Figure 1,

Figure 5 is an enlarged detail of the part of Figure 4 within the circle B,

Figures 6 to 8 are side elevational views of a hot fill PET bottle in accordance with a second embodiment viewed from different angles,

Figure 9 is a cross sectional view taken along the lines A-A of Figure 6, and

Figure 10 is an enlarged view of the part of Figure 9 within the circle B.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The drawing Figures 1 to 10 illustrate two embodiments of hot filled PET bottles. The embodiments are of a similar design and thus only one is described in detail.

In the embodiment shown in Figures 1 to 5 a PET bottle 10 comprises a base 11, a body 12 that is divided into a lower portion 13 and torso portion 14. The torso portion merging into a shoulder 15 which in turn terminates in an externally threaded neck 16. The threaded neck 16 is adapted to support an internally threaded cap or closure (not shown). The lower body portion is of substantially circular cross section and is provided with a series of (preferably four) strengthening ribs 20. Adjacent strengthening ribs are separated by an annular groove 21. A wider annular groove 22 separates the lower body portion 13 from the torso portion 14. The torso portion 14 is also substantially of circular cross section with a slight taper towards the neck 16 of the bottle 10. The torso portion 14 comprises three equally spaced lands 25, 26, 27 each separated by thermal expansion panels 30, 31, 32 so that the whole portion is constituted by the three lands 25, 26, 27 and the three panels 30, 31, 32. Each land 25, 26, or 27 is embossed with the trade mark AQUAVETA™ that extends substantially along the length of the land in a substantially two dimensional array of lettering.

Each thermal expansion panel 30, 31, 32 comprises a substantially planar area 40 that has positioned centrally thereof two tear drop shaped recesses 41, 42. The recesses 41, 42 are separated by a S-shaped upstanding land 43. The tear drop recesses 41, 42 define concave panels that can flex relative to their periphery, thus allowing the bottle to accommodate contraction caused by cooling of the liquid.

In the embodiment shown in Figures 6 to 10, a substantially similar bottle 10 is illustrated except that in this embodiment the three lands 25, 26, 27 that carry the embossed word trade mark have the trade mark

positioned in a bone shaped ribbed border 50.

Furthermore, the thermal expansion panels 30, 31, 32 whilst they still incorporate two tear drop shaped recesses 41, 42 joined by an S-shaped land 43, the recesses 41, 42 are enclosed within a raised rib 52 that defines an oval shaped space that contains the tear drop recesses 41, 42.

In both the embodiments the tear drop shaped recesses 41, 42 constitute a three dimensional logo that serves as an additional trade mark.

The hot fill PET bottle 10 described in both the above embodiments elegantly incorporates a three dimensional logo with the thermal expansion panel. Thus, instead of the thermal expansion panels contributing to an unsightly component of the bottle that needs to be covered up by a label, it is now possible to make the thermal expansion panel double as an eye catching logo. In this case, a three dimensional dual tear drop logo.

The invention in its broadest aspect envisages many types of three dimensional logo and a variety of a number of thermal expansion panels. The embossed trade mark that is in the preferred embodiment could vary or be omitted. It is understood that the capacity and size of the bottle could vary, for example from about 350ml to 1.5 litre through 500ml and 700ml and 1L sizes.

CLAIMS

1. A hot fill bottle of polymeric material having a plurality of thermal expansion panels equally spaced around a peripheral wall of the bottle and three dimensional logos embossed into the peripheral wall of the bottle characterised in that the three dimensional logos constitute, at least in part, the thermal expansion panels.

2. A hot fill bottle as claimed in claim 1, wherein the three dimensional logos constitute the whole of the thermal expansion panels.

3. A hot fill bottle as claimed in claim 1 or 2, wherein three equally spaced thermal expansion panels are provided.

4. A hot fill bottle as claimed in any preceding claim, wherein at least one of the three dimensional logos comprises two concave tear drop shapes interconnected by a raised land whereby the tear drop shapes are able to flex to compensate for volume changes of the bottle.

5. The hot fill bottle as claimed in claim 4, wherein all of the logos comprise two concave tear drop shapes interconnected by a raised land.

6 The hot fill bottle as claimed in any preceding claim, wherein the bottle is blow moulded in a polyester resin.

7. The hot fill bottle as claimed in claim 6, wherein said polyester resin is polyethylene terephthalate.

8. A hot fill bottle substantially as hereinbefore

described with reference to any one of figures 1 to 10.

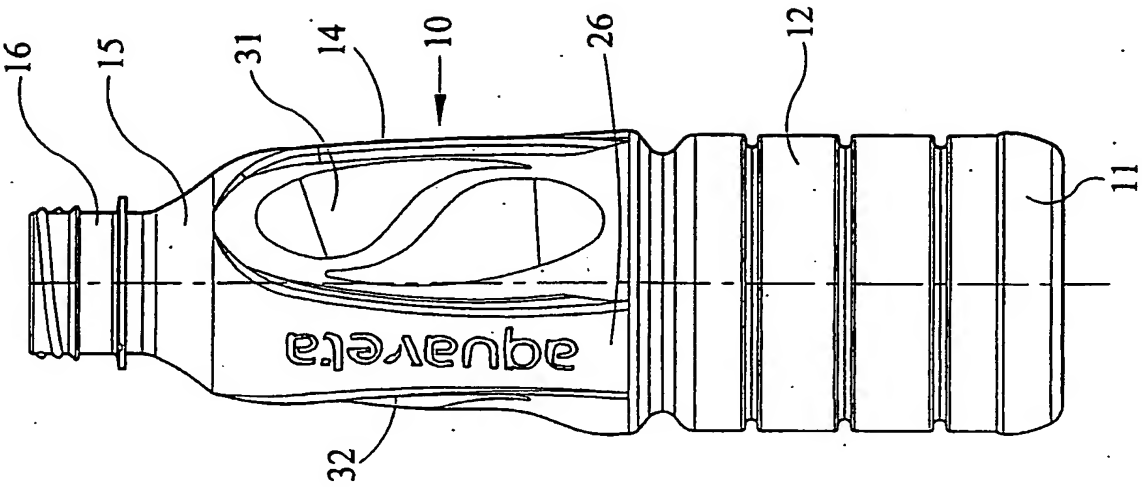


FIG 3

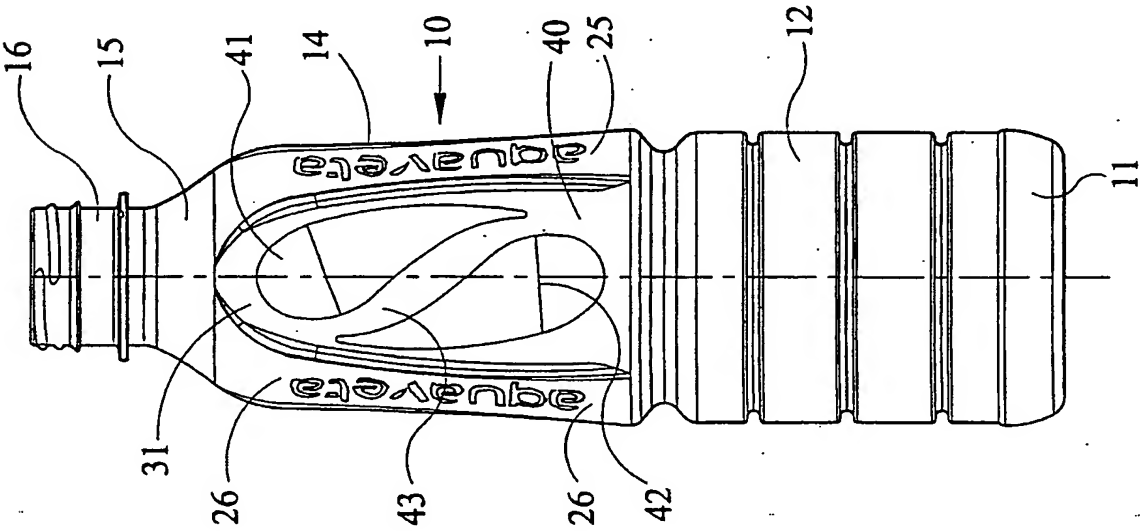


FIG 2

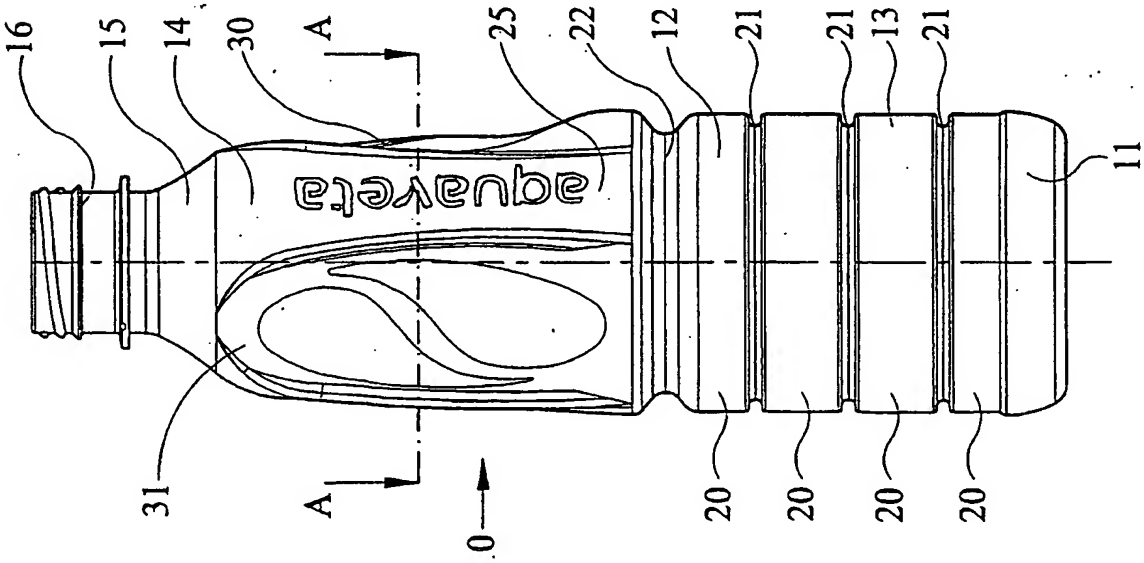
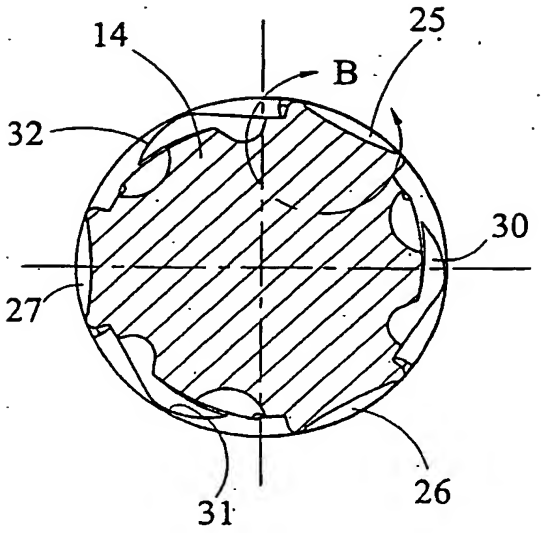
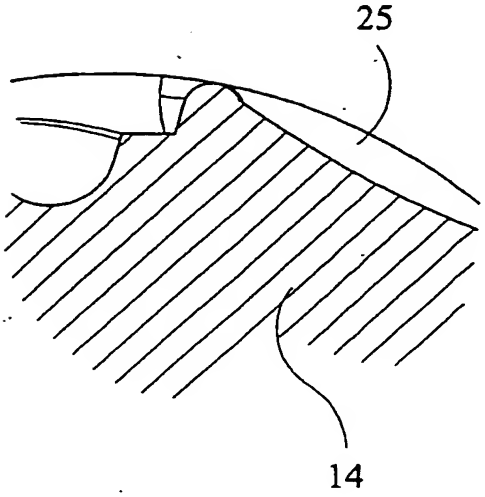


FIG 1



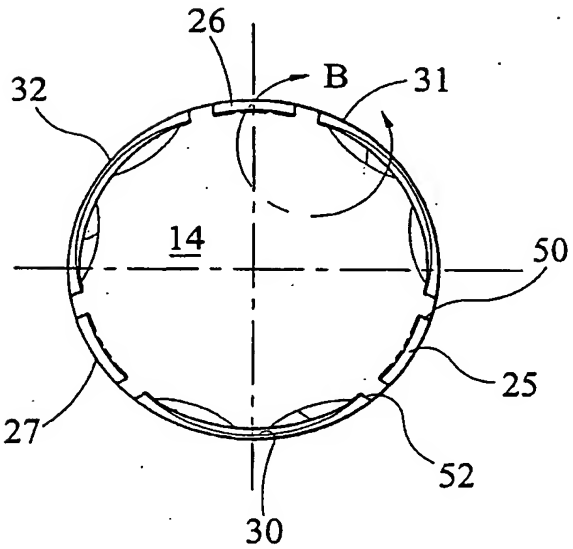
Section A-A

FIG 4



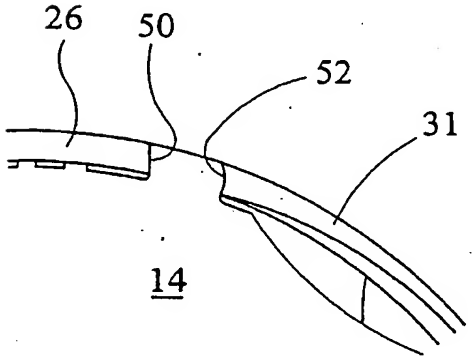
Detail B

FIG 5



Section A-A

FIG 9



Detail B

FIG 10

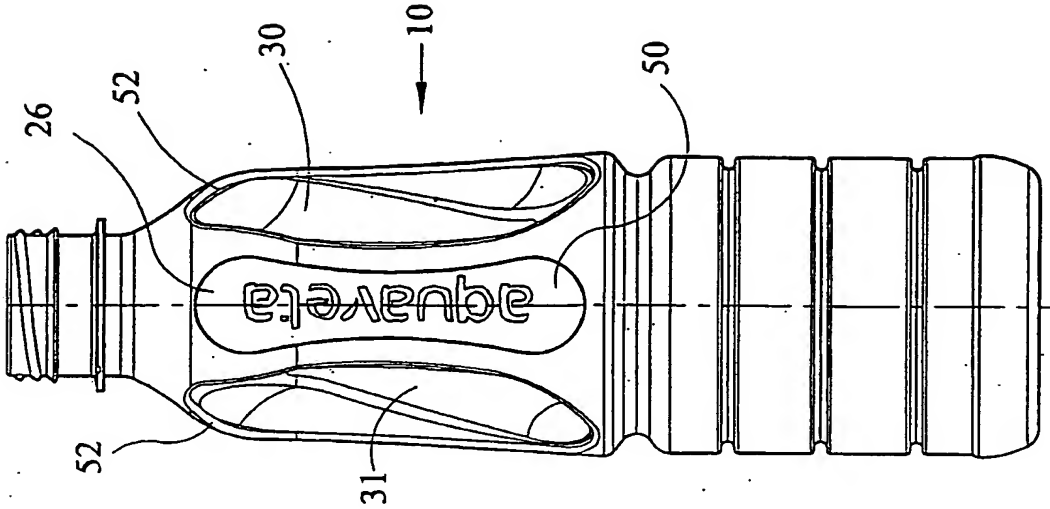


FIG 8

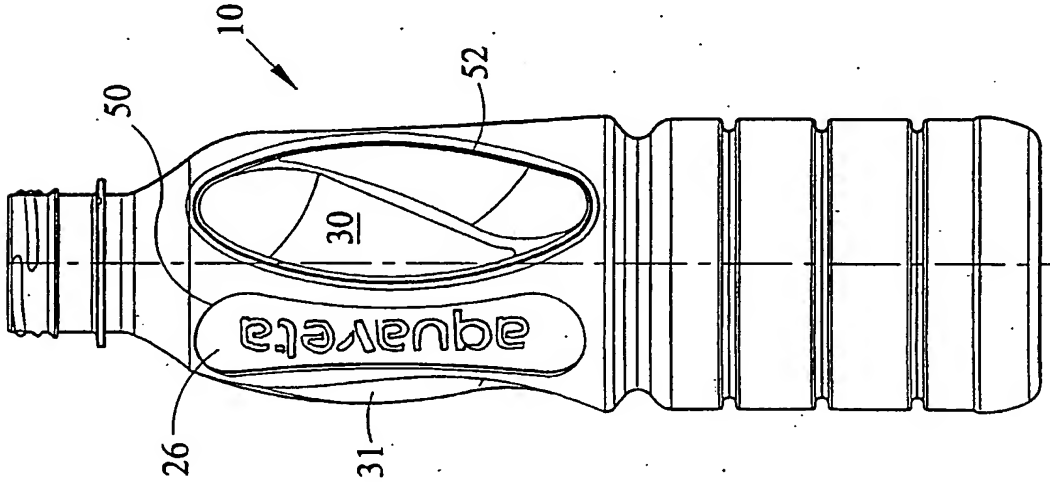


FIG 7

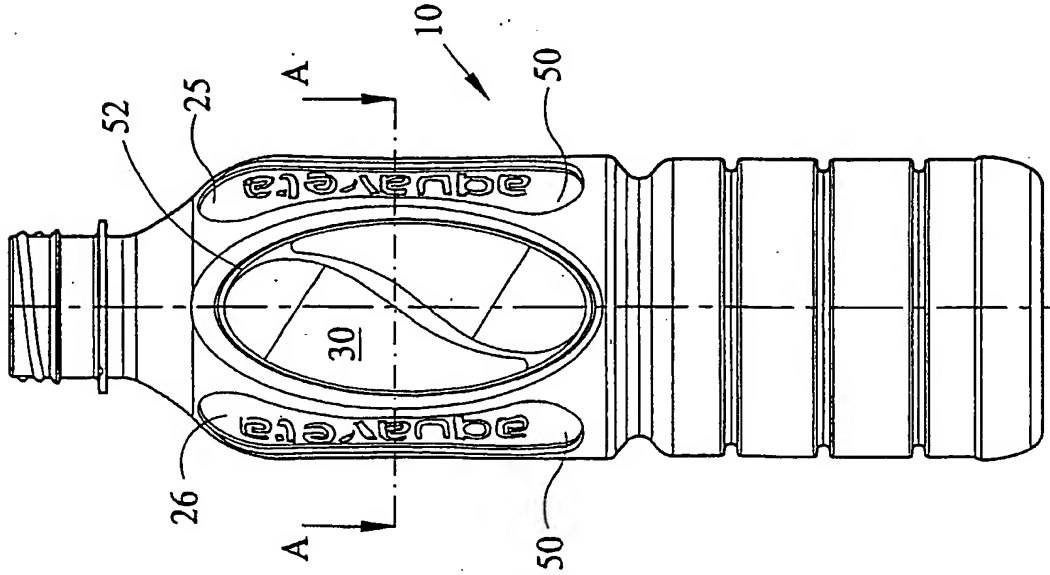


FIG 6

INTERNATIONAL SEARCH REPORT

International Application No
/GB2004/001518

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D79/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2002/096486 A1 (IIZUKA TAKAO ET AL) 25 July 2002 (2002-07-25) page 1, paragraph 5 - paragraph 12 page 3, paragraph 33; claim 9; figures 1,2	1,2,4-7 3
Y	WO 03/008278 A (GRAHAM PACKAGING CO) 30 January 2003 (2003-01-30) page 6, paragraph 3	3
A	US 5 803 289 A (BRADY THOMAS E) 8 September 1998 (1998-09-08) column 1, line 19 - line 55; figures 1,2	
A	WO 01/74689 A (GRAHAM PACKAGING CO) 11 October 2001 (2001-10-11) figure 1	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 July 2004	30/07/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Mans-Kamerbeek, M

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/001518

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 8
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 8

Claim 8 does not comply with Rule 6.2(a) PCT

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International Application No
/GB2004/001518

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